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THE APRIL MEETING OF THE KANSAS SECTION.

The sixth regular meeting of the Kansas Section, postponed from 1918 on account of war conditions, was held at the Kansas State Agricultural College, Manhattan, Kansas, Saturday, April 3, 1920. The chairman, Professor W. A. Harshbarger, presided at both the morning and afternoon sessions. In the absence of the secretary Professor E. B. Stouffer acted as temporary secretary.

The attendance was nineteen, including the following fifteen members of the Association: C. H. Ashton, Lucy T. Dougherty, Ottilia W. Dueker, W. H. Garrett, W. A. Harshbarger, Emma Hyde, S. Lefschetz, T. Lindquist, U. G. Mitchell, Mary W. Newson, B. L. Remick, E. B. Stouffer, W. T. Stratton, J. J. Wheeler, A. E. White.

The following officers were elected: Chairman, Professor W. H. GARRETT, Baker University; Vice-Chairman, Professor J. A. G. SHIRK, State Manual Training Normal School; Secretary, Professor E. B. STOUFFER, University of Kansas. It was decided to hold the next meeting at Topeka in the autumn in connection with the State Teachers Association. The visitors were entertained at a luncheon which was very kindly provided by the members of the department of Mathematics of the Kansas State Agricultural College.

The following six papers were read, the first three at the morning session and the remaining three at the afternoon session:

(1) "Content of the freshman algebra course," by Professor U. G. MITCHELL;

(2) "The bridge between high school and college mathematics," by Professor MARY W. NEWSON;

(3) "A comparative study of the algebraic preparation of the college freshman," by Professor W. H. GARRETT;

(4) "Geometrical representation of the nature of an essential singular point," by Professor C. H. ASHTON;

(5) "The dual of duality," by Professor E. B. STOUFFER;

(6) "Report on tests on college freshmen," by Professor W. T. STRATTON.

The discussion on the first paper was led by Professors Ottilia W. Dueker and A. E. White. There was also a general discussion on this paper and on the paper given by Professor Garrett. Abstracts of the papers follow below, the numbers corresponding to the numbers in the list of titles:

1. In this paper Professor Mitchell presented a list of topics, with a distribution of the number of class-periods suggested for each, to make up a five hour course for one semester designed for students who present but one year of high school algebra for entrance. With certain modifications and omissions the same could be used for a three hour course for one semester designed for students presenting one and one half years of high school algebra for entrance. The selection of material as presented was based upon a logical development of the subject-matter. It was pointed out, however, that the chief concern was not

the logical development of subject-matter but what material of an algebraic character could be best used by the teacher in developing the student's understanding and thinking power in regard to variables, their relations and uses. For the most part, students come to college with some facility in manipulating the symbols of algebra but without any adequate conception of the content represented by the symbols. The first consideration of the college teacher ought to be to give them this understanding. In order to do this the selection of material presented from the logical point of view might serve very well but it ought to be reorganized on an inductive basis and the arrangement improved. The results depend more upon the manner in which the material is used than upon its choice, provided, of course, that the choice be reasonably good.

In closing, it was pointed out that the greatest improvement which can be brought about in our first term algebra work, aside from the reorganization of the subject-matter, is likely to be brought about within a comparatively few years in two ways: (*a*) by a clearer formulation and understanding of the purposes to be sought, and (*b*) by the development and use of standardized tests for measuring the progress of the student and the progress of the teacher in accomplishing these purposes.

2. Professor Newson paid special attention to the high school algebra course. If the present tendency to omit the more intricate and difficult part of each topic continues, the conventional course will be completely revolutionized. The successful teaching of graphs and the consistent development of the function idea require more knowledge and ingenuity than some teachers now possess. The content and method of the constructive part of the modified course, if outlined by a general committee, should be made so explicit and complete that the ordinary teacher will be able to teach it successfully. The following are among the topics that should be considered: the best method of introducing and teaching the function idea; the postponement of equations having literal coefficients until the latter part of the course; the restriction of the subject of radicals to square roots, and that in connection with the quadratic equation.

3. Professor Garrett presented the results of an investigation he has been engaged in since 1912. By means of the data secured from more than fifteen hundred papers containing the answers to a set of test questions in elementary algebra, comparisons were made as to the efficiency of the preparation of the college freshman in different parts of the country. The results were not favorable to the Kansas freshman. Professor Garrett hopes to present his results for publication as soon as further data from the 1920 freshmen are secured and analyzed.

4. The nature of an essential singular point was illustrated by using $w = e^{1/z}$. In the functions $w = e^{z'}$ and $z' = 1/z$, the horizontal and vertical lines in the z'-plane were plotted in colors on the w and z-planes and the resulting curves compared with each other. Professor Ashton showed also that within a very small circle about the origin in the z-plane the entire w-plane may be plotted an infinite number of times.

5. Professor Stouffer showed that an easy method of introducing point-duality into projective geometry is by considering it as the space dual of plane-duality. Such a method is in line with the desire to form the duals of every concept introduced. Numerous illustrations of the different kinds of duality were shown.

6. Professor Stratton presented briefly the results of the freshmen engineering tests in arithmetic and algebra which had been conducted under the direction of Dr. J. C. Peterson of the Department of Education of the Kansas State Agricultural College. While the tests have not been carried far enough to justify any definite conclusions, yet there seems to be a close correlation between the test grades and the ability of the students to do their college work successfully.

H. E. Jordan, *Secretary-Treasurer.*

THE APRIL MEETING OF THE KENTUCKY SECTION.

The fourth annual meeting of the Kentucky Section was held at Centre College, Danville, Kentucky, on April 17; Professor C. G. Crooks of Centre College was chairman of the meeting.

There were ten present including the following seven members of the Association; P. P. Boyd, C. G. Crooks, J. M. Davis, H. H. Downing, E. L. Rees, C. H. Richardson, G. W. Smith. The section was the guest of the retiring chairman at an excellent dinner. For the ensuing year Professor H. H. Downing was elected chairman, and Dr. G. W. Smith, secretary-treasurer.

The following six papers were read;

(1) "Calculus ideas before Newton and Leibnitz," by Professor P. P. Boyd;

(2) "Some problems concerning the catenary," by Professor H. H. Downing;

(3) "A solution of Euler's equation," by Professor C. H. Richardson;

(4) "Some functions of a single nilpotent number," by Dr. G. W. Smith;

(5) "An early treatment of the quadratic transformation," by J. Osborn, Graduate Student, University of Kentucky. (By invitation.)

(6) "A hodge-podge of mathematical nonsense," by Professor E. L. Reese.

Abstracts of the papers follow below, the numbers corresponding to the numbers in the list of titles:

1. Professor Boyd outlined the calculus ideas of Archimedes, Kepler, Cavalieri, Pascal, Descartes, Fermat, Barrow, and Roberval and presented demonstrations from the works of these men by way of illustration. Finally Newton's and Leibnitz's treatments of the problem of tangents and quadratures were given.

2. Professor Downing made brief mention of the general theory in which it is shown that if $y = f(x)$ is the equation of a curve joining two fixed points and $I = \int F(x, y, y')dx$, then for I to be a minimum (or maximum) $f(x)$ must be a solution of the Euler differential equations. Also that the Weierstrass condition, the Legendre condition and the Jacobi condition relating to conjugate points, must be satisfied by $f(x)$.